भारतीय मानक
Indian Standard

IS 16942 : 2018

सिलिकोन सोया एल्किड बाहरी रोगन — विशिष्टि

Silicone Soya Alkyd Exterior Paint — Specification

ICS 87.040

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Paints, Varnishes and Related Products Sectional Committee, CHD 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints, Varnishes and Related Products Sectional Committee had been approved by the Chemical Division Council.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SILICONE SOYA ALKYD
EXTERIOR PAINT — SPECIFICATION

1 SCOPE

This standard specifies the requirements and methods of sampling and test for silicone soya alkyd exterior paint for application on exterior structures located in marine environment. This paint is one component system suitable for application by brush/spray.

2 REFERENCES

The standards listed below contain provisions, which through reference in this text, constitute provisions of and necessary adjuncts to this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
101 (Part 1/Sec 1) : 1986	Methods of sampling and test for paints, varnishes and related products: Part 1 Test on liquid paints (general and physical), Section 1 Sampling (*third revision*)
101 (Part 1/Sec 2) : 1986	Methods of sampling and test for paints, varnishes and related products: Part 1 Test on liquid paints (general and physical), Section 2 Preliminary examination and preparation of samples for testing
101 (Part 1/Sec 4) : 1987	Methods of sampling and test for paints, varnishes and related products: Part 1 Test on liquid paints (general and physical), Section 4 Brushing test (*third revision*)
101 (Part 1/Sec 6) : 1987	Methods of sampling and test for paints, varnishes and related products: Part 1 Test on liquid paints (general and physical), Section 6 Flash point (*third revision*)
101 (Part 1/Sec 7) : 1987	Methods of sampling and test for paints, varnishes and related products: Part 1 Test on liquid paints (general and physical), Section 7 Mass per 10 litre (*third revision*)
101 (Part 3/Sec 1) : 1986	Methods of sampling and test for paints, varnishes and related products: Part 3 Test on paint film formation, Section 1 Drying time (*third revision*)
101 (Part 3/Sec 4) : 1987	Methods of sampling and test for paints, varnishes and related products: Part 3 Test on paint film formation, Section 4 Finish (*third revision*)
101 (Part 4/Sec 4) : 1989	Methods of sampling and test for paints, varnishes and related products: Part 4 Optical tests on paint films, Section 4 Gloss (*third revision*)
101 (Part 4/Sec 2) : 1989	Methods of sampling and test for paints, varnishes and related products: Part 4 Optical tests on paint films, Section 2 Colour (*third revision*)
101 (Part 5/Sec 2) : 1988	Methods of sampling and test for paints, varnishes and related products: Part 5 Mechanical tests on paint films, Section 2 Flexibility and adhesion tests (*third revision*)
101 (Part 6/Sec 1) : 1988	Methods of sampling and test for paints, varnishes and related products: Part 6 Durability test on paint films, Section 1 Durability under conditions of condensation
101 (Part 6/Sec 2) : 1989	Methods of sampling and test for paints, varnishes and related products: Part 6 Durability test on paint films, Section 2 Keeping Properties (*third revision*)

IS No.	*Title*
101 (Part 6/Sec 5) : 1997	Methods of sampling and test for paints, varnishes and related products: Part 6 Durability test on paint films, Section 5 Accelerated weathering test
101 (Part 8/Sec 2) : 1990	Methods of sampling and test for paints, varnishes and related products: Part 8 Test for pigments and other solids, Section 2 Pigments and non-volatile matter (*third revision*)
101 (Part 8/Sec 6) : 1993	Methods of sampling and test for paints, varnishes and related products: Part 8 Test for pigments and other solids, Section 6 Volume solid.
513 : 1994	Cold rolled low carbon steel sheets and strips — Specification (*third revision*)
715 : 2002	Coated abrasives
1070 : 1992	Reagent grade water (*third revision*)
1303 : 1983	Glossary of terms relating to paint (*second revision*)
2552 : 1971	Steel drums (galvanized and ungalvanized) (*second revision*)
9788 : 1981	Titanium dioxide, rutile for paints — Specification

3 TERMINOLOGY

For the purpose of this standard the terms and definitions used in IS 1303 shall apply.

4 REQUIREMENTS

4.1 Composition

4.1.1 The paint is single pack system based on silicone soya alkyd resin. The paint shall be pigmented with titanium dioxide, rutile and suitable tinting agents.

4.1.2 The paint shall also meet the requirements specified in Table 1.

4.2 Keeping Property

The paint stored in original containers under normal conditions and examined by the method prescribed in IS 101 (Part 6/Sec 2) shall retain the properties specified in this standard for a period of minimum twelve months from the date of manufacture.

5 PACKING AND MARKING

5.1 Packing

The paint shall be packed in mild steel drums of 20 litres capacity (*see* grade B2 of IS 2552). Drums should be fitted with 100 mm inner plug and capseal closures. Drums shall be provided with a strap handle in the centre of the top not projecting beyond the top rim of the drum.

5.2 Marking

5.2.1 Each drum shall be legibly marked as under:

a) Name of the material;
b) Manufacturer's name and / or his recognized trade mark, if any;
c) Serial number (n) of the drum along with the total number (N) of drums in the same batch (that is, n/N);
d) Batch number or lot number in code or otherwise;
e) Month and year of manufacture; and
f) Net and gross weight of drums.

5.2.2 *BIS Certification Marking*

The container may also be marked with the Standard Mark.

5.2.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations made there under. The details of the conditions under which the licence for use of the Standard Mark may be granted to the manufacturers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

The representative sample shall be drawn as prescribed in IS 101 (Part 1/Sec 1).

7 TESTS

7.1 Unless specified otherwise, methods of test prescribed in IS 101 series of standards shall be followed.

7.2 For all tests, mild steel panels (*see* IS 513) shall be prepared and used. The preparation of metal panels shall be as prescribed in IS 101 (Part 1/Sec 3).

7.3 Quality of Reagents

Unless or otherwise specified, analytical reagent grade chemicals and reagent grade water (*see* IS 1070) shall be used.

NOTE — Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

7.4 Test certificate shall be in a format as agreed between the purchaser and the manufacturer.

Table 1 Requirements of Silicone Soya Alkyd Exterior Paint

(*Clause* 4.1.2, 4.2 *and* 7.1)

Sl No. (1)	Characteristic (2)	Requirement (3)	Method of Test (Reference to IS 101) (4)	Reference to Annex (5)
i)	Preliminary examination	Paint, on stirring, shall easily produce homogenous material suitable for application by brushing / spraying	Part 1 / Sec 2	—
ii)	Application properties	Suitable for application by brush / spray	Part 1 / Sec 4	—
iii)	Finish, when applied at a dry film thickness of 30 ± 5 micron	Paint shall have smooth, uniform and wrinkle-free finish, without sagging	Part 3 / Sec 4	—
iv)	Mass in kg / 10 l, *Min*	13.5 to 14.5	Part 1 / Sec 7	—
v)	Gloss	Coating shall have a gloss value of 55 ± 5 when measured using 60° angle head glossmeter	Part 4 / Sec 4	—
vi)	Gloss retention	Gloss retention shall not be less than 50 percent of initial value	—	A
vii)	Flash Point	Above 30°C	Part 1 / Sec 6	—
viii)	Colour	Light grey (RAL 7040)	Part 4 / Sec 2	—
ix)	Drying time, *Max*		Part 3 / Sec 1	—
	a) Surface dry	2 h		
	b) Hard dry	16 h		
x)	TiO_2 (Rutile), percent by mass of total pigment, *Min*	65	IS 9788	
xi)	Viscosity, time for efflux from flow cup at 27 ± 2°C, second	85 ± 15	Part 8 / Sec 6	—
xii)	Pigment, percent by mass, *Min*	42	Part 8 / Sec 2	—
xiii)	Non-volatile matter content percent, *Min*	22	Part 8 / Sec 2	
xiv)	Silica (SiO_2), percent by mass of solid binder, *Min*	14	—	B
xv)	Scratch hardness test at 1 000 g load)	The paint film shall not show any scratch up to bare metal	3 of Part 5 / Sec 2	—
xvi)	Covering capacity by brush at a dry film thickness of 30 ± 5 micron, sq m/litre	10.0 ± 2.0	(Part 1 / Sec 4)	
xvii)	Resistance to corrosion under neutral salt spray for 3 weeks on burnished mild steel panel [one coat of red oxide zinc phosphate primer (*see* IS 12744) and one coat of finishing]	The specimen shall not show any sign of corrosion or blistering	3 of Part 6 / Sec 1 (*see* Note)	— —

NOTE — A week of test period will include 5 days (Monday to Friday) exposure to salt spray and 2 days (Saturday and Sunday) without exposure, but with panels remaining in the cabinet.

ANNEX A

[*Table* 1, *Sl. No.* (vi)]

DETERMINATION OF GLOSS RETENTION

A-1 OUTLINE OF METHOD

The coated aluminium panels are exposed to cyclic UV radiation and condensation at controlled temperature limits for specified exposure period. Painted surface is examined for percent gloss retention.

A-2 APPARATUS

A-2.1 Accelerated weathering apparatus of UV-B type.

A-2.2 Gloss meter having 60° head.

A-3 TEST PANEL

A-3.1 Prepare abraded aluminium panels of size 150 × 75 × 1 mm as prescribed in **4.1**, **4.2**, **4.3.1**, **4.3.2** and **4.3.3** of IS 101 (Part 1/Sec 3). However, abrasion may be done only with IS Grit No. 180 emery cloth as per IS 715.

A-3.2 Apply two coats of high performance exterior with an interval of 24 h between each coat to give a dry film thickness of 70 ± 10 micron. Allow the painted panel to dry for three days.

A-4 PROCEDURE

A-4.1 After drying the panel for three days, measure gloss of the painted with the help of glossmeter using 60° angle head.

A-4.2 An artificial weathering apparatus of UV condensation type with following test condition parameters.

a) Lamp type	: UV B-313
b) Test Cycle	: UV 4 h at 55 ± 5°C
Condensation	2 h, 45 ± 5°C
c) Irradiance	: 0.67
d) UV wavelength	: 295 nm to 325 nm

For details of method of tests with QUV apparatus, follow **6** of IS 101 (Part 6/Sec 5) or the instructions given in the manufacturer's manual.

A-4.3 The gloss of painted exposed surface shall be measured after 250 h of exposure with glossmeter using 60° angle head after cleaning the surface with fresh water and drying.

ANNEX B

[*Table* 1, *Sl. No.* (xiv)]

DETERMINATION OF SILICA CONTENT

B-1 OUTLINE OF METHOD

The binder is heated in a muffle furnace and silica content is determined gravimetrically.

B-2 APPARATUS

B-2.1 Silica Crucible

B-2.2 Bunsen Burner

B-2.3 Muffle Furnace — Of range up to 1200°C

B-2.4 Analytical Balance — Of least count 0.1 mg

B-3 PROCEDURE

Take 25 to 30 g of high performance exterior paint. Separate the binder as per method prescribed in IS 101 (Part 8/Sec 2). Weigh 3/4 g of binder in weighed, cleaned, dried silica crucible. Heat the silica crucible on burner till binder becomes free from soot. Place the crucible in muffle furnace. Set the temperature of furnace at 800°C. After attaining the temperature, maintain for 2 h. Remove the sample from muffle furnace. Place the sample in desiccator for cooling. After cooling, weigh the crucible and calculate the percent of silica as follows:

$$\text{Percent silica} = \frac{A \times 100}{S}$$

where,

A = Weight of ash, and

S = Weight of binder.

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Amendments Issued Since Publication

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